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ABSTRACT

Mining is the second smallest industry division in terms both of employment and number of business units in Australia. Employment accounts for less than 1 percent of all jobs. The outlook for employment is clouded by continuing uncertainty in Australia's main Asian markets and by the longer-term impact of environmental concerns. Mining industry employment is dominated by male full-time jobs, particularly in the coal mining and metal ore mining sectors. It has the lowest level of part-time jobs and jobs for women of all industry sectors. Overall downward movement in employment is expected. The mining industry differs from the total workforce's occupational composition in having a high proportion of its workforce in the intermediate production and transport group. It also has a well-above-average proportion in the tradespersons and related category, indicating it is significantly dependent on the vocational education and training (VET) sector for its skills formation. A disproportionately high number of workers have a trade qualification. Average weekly hours worked are well above the all-industry average. Mining employees are the highest earning workers in Australia. Most employment is found in Western Australia and New South Wales. VET graduates employed in mining rate the relevance of their training quite high. The mining industry spends substantially more per employee on structured training than any other industry. (Four tables are appended.) (YLB)

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Industry training monograph

NCVER

Mining

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Industry training monograph

Mining

1998

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Preface

THE MINING INDUSTRY training monograph is one of a series of monographs which has been designed to provide readers with an overview of occupational trends and the current training effort in each industry in Australia.

The monograph analyses data at the major Australian and New Zealand Standard Industry Classification (ANZSIC) industry division level, given that it is at this level most data are collected and disseminated. The monograph addresses:

- recent employment trends
- recent occupational trends in key skills areas
- current training arrangements, particularly training levels and outputs

The monographs bring together for the first time a range of survey data from the Australian Bureau of Statistics (ABS) together with graduate destination, employer satisfaction with training and other training data compiled for the Australian National Training Authority (ANTA) by the National Centre for Vocational Education Research (NCVER).

I would like to thank Tom Dumbrell for preparing these monographs and I would also like to acknowledge John Ray's contribution to the analysis of employment and occupation data.

NCVER acknowledges ANTA's significant contribution to the cost of this monograph in sponsoring its publication.

I hope that the material in this publication will be of interest to Australia's vocational, education and training (VET) sector. In particular the document is designed for industry decision-makers, policy-makers, teachers and trainers, researchers and students with an interest in VET.

Readers who are interested in more information about training markets or other areas of VET research are referred to the NCVER's research database, VOCED. Printed and diskette versions of VOCED can be obtained from NCVER (ph +61 8 8333 8400) or it can be accessed directly on the world wide web at the following address:
<http://www.ncver.edu.au/voced.htm>

Chris Robinson, National Centre for Vocational Education and Research Ltd

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The mining industry in Australia

Overview

MINING IS THE second smallest industry division in terms both of employment and in the number of business units in Australia, larger only than the rapidly declining electricity, gas and water utilities sector. There are only about 83 000 persons working in the industry in Australia in about 2800 enterprises.[1] Over the last ten years employment in mining has declined by about 14%, or by around 14 000 jobs.

It is, however, a vital part of the Australian economy, accounting for about 18.5% of total Australian exports by value, behind manufactured exports which account for 51% of total exports and services, accounting for 20.2%. It is ahead of the agricultural sector, which accounts for about 8.4% of exports.[2]

Most employment in mining is shared fairly evenly between coal and metal mining, with employment averaging between 25 000–30 000. The major metals mined in Australia are gold, iron ore, silver/lead/zinc, copper, bauxite and mineral sands. Among these sectors, gold and iron ore mining are the major employing sectors.

Over the last few years the value of Australian mineral production has risen from $25.7 billion in 1993–1994 to $28.7 billion in 1995–1996, the latest year for which data are available.

The mining industry has the highest average full-time wage rates of all industries in Australia, the lowest level of part-time employment, and has the lowest level of female employment of all Australian industries. Only about 12.5% of the employees in mining are females, whereas over 43% of the total Australian workforce are females.

Over the last decade Asia has become a more important destination for Australian mineral exports. By 1996–1997 Asia was receiving 68% of Australia's mineral exports, up from about 59% in 1988–1989. In the energy sector (largely coal exports), Australia's exposure to Asia has declined in recent years from about 64% in 1988–1989 to about

[1] Australian Bureau of Statistics (ABS), *Labour force, Australia*, cat.6203.0, November 1997

[2] Department of Foreign Affairs and Trade (DFAT) and ABS cat.5302.0, quoted in Industry Commission, *The changing of Australian manufacturing*

61% in 1996–1997. This was largely because of reduced dependence on Japan which was, however, offset by a big rise in exports to South Korea.[3]

Despite the declining economic situation in Asia, export earnings from minerals are expected to grow in 1997–1998, as the lower Australian dollar will offset lower commodity prices. Over the longer term most forecasters expect strong growth in Australian production of minerals and energy products but earnings are not expected to grow at the same rate as real prices decline. Continuing low world gold prices should inhibit growth in that sector.

The poor outlook for growth in Asia and thus Australian exports of mineral and energy products indicate that the recent high levels of investment in exploration, growing at around 10% per annum during the 1990s, and the development of new mines, might not proceed at the same rate as in recent years. The latest quarterly National Australia Bank (NAB) survey shows mining companies expect business conditions to deteriorate over 1998; however, the Reserve Bank expects investment growth in mining to be 'very strong' this financial year.[4]

The other important issue to consider is the importance of coal as a major component of Australian mine exports. International concerns over greenhouse gas emissions did not lead to stringent restrictions on coal consumption at the 1997 Kyoto Conference; however, it is unlikely that such concerns will disappear. With employment in coal mining accounting for a significant share of mining employment in Australia, and given its relatively geographically specific distribution, the long-term outlook for employment in the industry is uncertain.

Within vocational education and training (VET) there is a paucity of data allowing the identification of the level of government funding for mining industry training. Mining is included within the Australian National Training Authority (ANTA) 'training area' of engineering and mining. It is likely that most of the training undertaken within this category is not targetted at the mining industry. In 1995, 6.8% of training activity was directed specifically towards engineering and mining, while in 1996 this was expected to fall to 6.5%.

Employers in mining were big spenders on training. At the 1996 training expenditure survey, average expenditure on structured training per employee during the three-month survey period in the mining industry was $896, the highest of all industries and almost five times the all-industry average of $185.

In the technical and further education (TAFE) graduate destination survey for 1997 (GDS), compiled by the National Centre for Vocational Education Research (NCVER), only about 1% of TAFE graduates (429 persons) were working in the mining industry. Over 45% of these had completed either a trade certificate or a certificate (other). In the survey on employer satisfaction with VET for 1997 (ESS), also compiled by NCVER, employers in mining gave the VET sector the second lowest rating of all industries.

[3] Brian Fisher, executive director, Australian Bureau of Agricultural and Resource Economics (ABARE), *Outlook 98*, Australian Commodities Overview, <www.abare.gov.au>

[4] Reserve Bank of Australia Bulletin, February 1998

- Mining is the second smallest industry division in terms of employment, accounting for less than 1% of total employment.
- Mining accounts for 18.5% of Australian exports.
- Exports to Asia have grown strongly over recent years; however, the Asian financial crisis is likely to inhibit growth in exports over the next few years.
- The industry has a very high proportion of males, full-time jobs and has the highest earnings of any industry.

An industry snapshot

Employment in the mining sector, at 83 200, accounts for less than 1% of all jobs in Australia. As noted in the previous section, employment in the Australian mining industry has declined by 14% over the last ten years, largely reflecting changing extraction methods in the coal mining sector. While employment has declined the value of the industry's output, exploration and capital investment in the industry have all grown over recent years.

The outlook for employment in mining is clouded by continuing uncertainty in Australia's main Asian markets and by the longer-term impact of concerns over greenhouse gas emissions and the consequent impact on the coal mining industry.

As shown in table 2.1, mining industry employment is dominated by male full-time jobs, particularly in the coal mining and metal ore mining sectors. Mining has the lowest level of part-time jobs and jobs for women of all industry sectors. Only 2500 of the industry's 83 200 jobs in November 1997 were part time and only 9100 of the industry's employees were women. Only about 20% of the industry's workforce was born overseas, noticeably below the 24% average that applies across all industries.

Table 2.1: Employment ('000s) in mining by sub-division, by gender and type of employment, Australia, November 1997

Industry sub-division	Males	Females	Full-time	Part-time	Total
Coal mining	25.7	0.8*	26.2	0.3*	26.5
Oil and gas extraction	4.5	0.3*	4.8	0.0*	4.8
Metal ore mining	26.6	3.7	29.8	0.5*	30.3
Other mining	5.9	1.3*	6.4	0.9*	7.3
Services to mining	11.5	2.9*	13.4	0.9*	14.3
Total	**74.2**	**9.1**	**80.7**	**2.5***	**83.2**

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6203.0, November 1997

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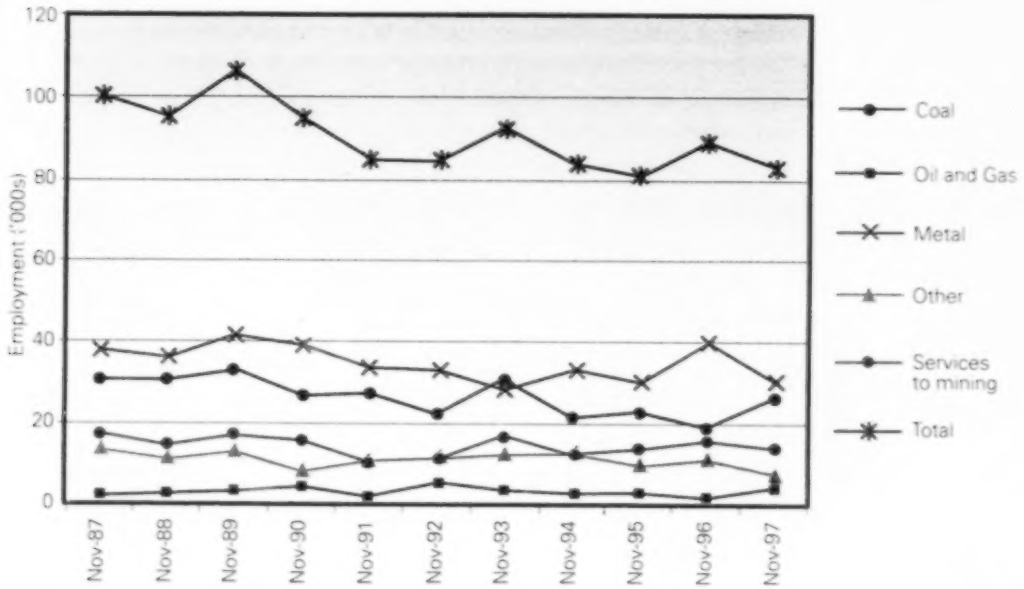
Employment trends in the sub-sectors of the industry over the last ten years are shown in the following chart. It shows that overall employment has declined from 100 000 in November 1987 to 83 200 in November 1997. Employment in the individual sub-sectors has fluctuated over the last ten years, with a slow downward shift. Further downward movement is expected in the short to medium term, given the poor outlook for demand for energy and minerals in Australia's main Asian markets.

Chart 2.1: Employment in mining, by sub-division, Australia, 1987–1997 (ABS labour force survey)



Source: ABS, *Labour force, Australia*, cat.6203.0, 1987–1997

Table 2.2 shows the detailed breakdown of employment in the mining industry in Australia by the various types of mining activity. Even though the coal and metal ore sectors account for about the same level of employment, there are considerably less establishments in the coal sector and its wages and salaries are over 24% higher than that of the metal ore sector.

Occupational composition

The mining industry differs from the total workforce's occupational composition in having a high proportion of its workforce in the intermediate production and transport group. It also has a well-above-average proportion in the tradespersons and related category, indicating that although employment in the sector is relatively small, it is significantly dependent on the VET sector for its skills formation.

The mining industry's broad workforce composition is compared with the composition of the total workforce in table 2.3. The industry has relatively fewer of its workers in the management and professional categories than the total workforce, indicating it is relatively less reliant on higher education than most industries.

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Importantly, it also has a very small proportion of its workforce, less than 7%, in the two lowest skilled categories, compared with over 20% of the total workforce found in these areas.

Table 2.2: Employment in mining by detailed activity, Australia, 1996–1997

Industry sub-sector	Establishments At 30 June	Employment At 30 June	Wages and salaries $million
Coal	179	25 760	2 093.6
Oil and gas	93	3 567	314.0
-Iron ore	22	6 466	444.8
-Bauxite	10	1 809	95.0
-Copper	20	2 664	155.1
-Gold	165	8 150	492.3
-Mineral sands	19	1 977	94.9
-Silver-lead-zinc	15	3 572	258.0
-Other metal	20	2 422	152.2
Total metal ore	271	27 059	1 692.3
Total	**543**	**56 386**	**4 099.9**

Source: ABS, *Mining, electricity and gas operations, Australia*, cat.8401.0, 1996–1997

The high level of industry expenditure on structured training suggests a propensity for the industry to develop its own training arrangements to meet the very specific training requirements of the industry, together with the remote locations of mining activities. This approach is consistent with the industry's propensity to provide its own infrastructure when developing new projects, such as purpose-built mining towns, etc. The need for specific training arrangements in the mining industry perhaps explains why mining industry employers gave a relatively low rating to publicly provided VET.

Table 2.3: Occupational profile, mining and total workforce, Australia, November 1997

Occupation group	Mining %	Total workforce %
Managers and administrators	5.5	7.6
Professionals	15.3	17.4
Associate professionals	9.0	10.5
Tradespersons and related	20.8	13.2
Advanced clerical and service	1.9	4.5
Intermediate clerical/sales/service	4.8	17.1
Intermediate production/transport	36.1	9.2
Elementary clerical/sales/service	1.7	10.5
Labourers and related	4.9	10.1
Total	**100.0**	**100.0**

Source: ABS, *Labour force*, Australia, cat.6203.0, November 1997

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Qualifications profile

In line with the overall decline in employment in the industry, most of the main individual occupations within the industry have also declined over the last decade. Specific movements are examined later in this monograph.

The qualifications profile of the industry follows the occupational profile outlined above. Table 2.4 shows that a disproportionately high number of workers in the industry have a trade qualification, a below-average number have a university qualification, and a below-average number are without formal post-school qualifications. While about 31% of the total workforce has qualifications in the 'middle-ranking' levels where VET is the provider, over 40% of workers in mining have this level of credential.

Table 2.4: Qualifications of mining workers, percentage distribution, Australia, May 1997

	Bachelor's degree or higher	Diploma/ associate diploma	Skilled vocational	Basic vocational	Without post-school qualification
Mining	12.4	6.9	26.2	7.7	46.5
Total industry	**17.2**	**9.0**	**12.6**	**9.4**	**49.4**

Source: ABS, *Transition from education to work*, cat.6227.0, May 1997

Occupational trends and skills shortages

As noted above, employment in the industry over the last decade has seen most of the main occupations in the industry decline. The following table highlights the changes in the industry's main occupations over the period 1987 to 1996. Note that this table uses the older Australian Standard Classification of Occupations (ASCO first edition) code, and differs from the occupational composition table above.

Table 2.5: Employment growth ('000s) in mining by selected occupation, Australia, 1987–1996

	Building professionals and engineers	Engineering and building technicians	Metal fitting and machining trades	Electrical and electronic trades	Road and rail drivers	Mobile plant operators	Stationary plant operators	Mining labourers	Total all occupations
1987	4.9	4.9	9.3	5.5	5.8	11.3	8.7	18.1	101.8
1996	3.7	2.8*	7.4	5.2	5.5	12.3	9.0	13.2	87.6
Change	**–1.2**	**–2.1**	**–1.9**	**–0.3**	**–0.3**	**1.0**	**1.3**	**–4.9**	**–14.2**

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6203.0, 1987, 1996

Only two occupations in mining saw growth over the decade—mobile and stationary plant operators. It is likely that many of these occupations are highly specific to the industry and hence this might explain the high level of industry own-purpose training expenditure. Their growth was about matched by the decline in trades occupations.

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An above-average proportion of the mining industry employers surveyed in the ESS believed that there were sufficient VET graduates to meet current industry needs. The small proportion, about 20%, who thought there were shortages of graduates identified the plant operator category as the most common area of shortage. Of those identifying shortages, 64% identified this occupation, while 36% identified shortages in the trades area.

Quite a high proportion, 21%, identified shortages of mining labourers, perhaps reflecting the geographically remote nature of the industry. It could be also that this classification disguises as apparently unskilled, jobs that in fact have considerable skills content.

In 1997, the National Mining Industry Training Advisory Body (ITAB) reported to ANTA that:

> *Skill shortages in the mining and extractive industries fall into two categories: general skill shortages (literacy, occupational health and safety, communications, etc.) and industry-specific or technical skills (miners, open-cut examiners, mechanical and electrical engineers). Of serious concern is the shortage of qualified under-managers in the coal sector: underground coal mines are obliged by law to have a specified number of these officers.*
>
> *This shortage is of immediate concern in Queensland and New South Wales. Broken Hill projects a shortage in entry-level metalliferous miners in three to five years time; this is due to replacement of retiring miners rather than to increased employment numbers. In the drilling sector, shortages are being experienced in mechanical fitters, drillers and supervisors, particularly in central New South Wales. This is due to significant sector activity.*
>
> *Tasmania is experiencing shortages in professional occupations such as metallurgists, chemical engineers, mining and mechanical engineers. In addition, there are periodic regional shortages in the smelting and mining areas.*
>
> *The Western Australian minerals industry is undergoing major expansion and diversification. Insufficient numbers of apprentices are commencing within the industry, and there is a difficulty in maintaining a skilled workforce in remote locations. Short- and medium-term shortages include mechanical engineering and electrical tradespersons; multiskilled mobile plant operators; underground miners; metallurgical technicians, draftspersons; and specialist professionals, such as geoscientists and metallurgists.*
>
> *The Northern Territory has shortages in the following occupational areas: senior geologists; experienced field technicians; mobile plant operators; and supervisors.*
>
> *Job vacancies in South Australia have not yet been quantified, but appear to be related to expansion of existing operations, such as Olympic Dam. Some shortages of trained drilling plant operators already exist.*

7

Hours of work and earnings

Average weekly hours worked in the industry in November 1997 were 43.9, well above the all-industry average of 35.6 hours. The latest available average annual earning data show that mining employees were the highest earning workers in Australia, earning (in 1993–1994) $57 763 per annum, double the average at the time across all industries of $28 958.

Geographical distribution of mining

The geographical distribution of the industry is quite different from the distribution of employment generally. Most employment in mining is found in Western Australia and New South Wales. In New South Wales coal is the predominant employment sector while in Western Australia metalliferous mining is more significant. More importantly, employment in mining is mostly located away from the main population centres, providing an important source of jobs in rural and remote areas.

Table 2.6: Employment ('000s) in mining by State/Territory, 1995

	Mining employment by State/Territory								
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aust
Males	25.3	4.9	15.7	2.2*	23.0	1.4*	2.3*	0.2*	75.0
Females	0.6*	1.3*	3.2*	0.3*	3.7	0.3*	0.2*	0.0*	9.6
Total	**25.9**	**6.2**	**19.0**	**2.5***	**26.7**	**1.7***	**2.5***	**0.2***	**84.7**

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6204.0, 1995

- ❖ Employment in the mining industry has been declining over the last decade.
- ❖ The industry has a high proportion of workers with skilled vocational qualifications and a high proportion of tradespersons and a low proportion of university qualified workers.
- ❖ The industry has the lowest proportion of part-time workers and the lowest percentage of females of all industries in Australia.
- ❖ There is little evidence of widespread skills shortages in the sector although some specific areas of shortage exist in some States.

Training in mining

Government support for training

As noted earlier, it is difficult to identify the level of government support for training in the mining sector, as the statistics combine engineering and mining as one 'training area' in the ANTA statistics. That category accounted for 6.8% of the allocation of government training funds in 1995, declining to 5.8% in 1996. While it is difficult to estimate mining's share of this, it has such a small share of total employment that it would not be possible to argue that it is not receiving a reasonable share of training

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funds. Mining does, however, have an occupational profile which makes it relatively more dependent on the VET sector than most industries.

The other statistical classifications used in VET do not provide a better view of the degree to which VET is directly addressing the needs of the mining industry. Neither field of study nor discipline group specifically address mining skills.

Employer satisfaction with VET

At the 1997 ESS, only 0.4% of employers surveyed were mining industry employers with recent VET graduates. An above-average proportion of the industry's VET graduates had been employed before graduating. VET graduates working in mining were relatively more likely to hold one of the higher-level VET qualifications, a certificate or diploma.

Mining was also one of the industries more likely to use non-TAFE VET providers, with 30% of employers surveyed partly or fully using non-TAFE providers.

Mining was the industry with the second lowest satisfaction score for VET, rating non-TAFE providers slightly ahead of TAFE. The overall average satisfaction rating given was 6.1 on a 10-point scale. Most industries rated satisfaction with VET at 6.7 or 6.8. Only the accommodation, cafés and restaurants industry gave a lower rating to VET than mining.

When asked to identify the area of VET provision most in need of improvement, employers in mining most frequently nominated a need to improve the balance in VET courses between theory and practice. This response only rated sixth in importance across all industry sectors, indicating some specific issues in mining that should be investigated further.

The second area of improvement identified by employers was a need to improve graduates' work ethic, the area most frequently nominated by all employers.

VET graduates in mining

The GDS of 1997 found 1% of surveyed graduates working in the mining industry, about the industry's overall employment share. Graduates employed in mining rated the relevance of their training quite highly—53.8% rated their course as highly relevant, the fifth highest rating of all industries. Only 15.7% rated their training as of little or no relevance.

While most mining industry employment occurs in Western Australia, the largest share, 40.6%, of the graduates surveyed who were working in mining were in New South Wales. This would indicate that TAFE is providing more training to the sector in New South Wales and less to the sector in Western Australia and Queensland where the mining areas may be more remote.

Of the 429 graduates surveyed, the most common qualifications they had obtained were:

- trade certificate – 100
- certificate (other) – 95
- associate diploma – 50
- Australian Qualification Framework (AQF) certificate II – 47

Of these 429 graduates, only 81 (19%) had not been employed before starting their course, and only 4% were working part time when surveyed. Of those graduates who were employed during the final semester of their course a high proportion, 72%, received some form of financial support, mostly paid fees and/or paid time off work. This level of support was the second highest of all industries, behind only the electricity, gas and water industry.

Of those graduates who did not have a job on graduation, most had found their job in mining in less than three months.

Average weekly earnings of graduates working in mining were by far the highest of any industry for both males and females. Full-time male workers were earning $917 per week while full-time females earned $660. This $257 differential between male and female full-time earnings was the highest of any industry, despite the fact that this was the industry providing the highest level of earnings for female TAFE graduates.

While graduates in mining gave an overall good rating to the relevance of their course, there were some areas where approval ratings were below average. Graduates in the survey were asked to give a rating to a number of aspects of their course, scoring them on a 10-point scale. The areas receiving low rating were:

- whether course content reflected industry practice
- whether there was sufficient equipment for practising skills
- the adequacy of information received when choosing courses and subjects, and especially
- the adequacy of information provided about careers and jobs, where only 30% gave this item a score of 7 or better on the 10-point scale. The all-industry score on this item was a low 41%; however, the 30% rating in this industry is indicative of a specific failure to provide sufficient information on which to base sensible career choices

Respondents, on the other hand, gave a high rating to how well their qualification was regarded by employers and the overall quality of the course.

The most common motivations for undertaking the course for those working in mining was that the course was a requirement of their job. Almost all who gave this as their motivation were successful in achieving this end. Acquiring extra skills for their job, or achieving a better job or a promotion were the next most important motivators, again achieved either fully or in part by almost all respondents.

Apprenticeships in mining

As noted earlier, the trades category is an important one in the mining industry. Because mining is a relatively small area, separate data for apprenticeships in mining are not published in *Transition from education to work* (ABS, cat.6227.0) and are included in the 'other' category, along with nine other industries.

Table 2.7: No. of apprentices ('000s) by industry of employment, 1995–1997, Australia

Industry	1995	1996	1997
Manufacturing	35.2	30.5	25.2
Construction	26.3	27.5	23.2
Wholesale/retail	30.5	28.3	35.3
Accommodation/cafés/restaurants	5.7	8.8	13.7
Cultural/recreation/personal services	8.0	10.6	7.8
Other	**13.5**	**20.6**	**15.9**
Total	**114.6**	**126.3**	**121.1**

Source: ABS, *Transition from education to work*, cat.6227.0, May 1997

Employer support for training

The mining industry spends substantially more per employee on structured training than any other industry. The 1996 training expenditure survey shows that for July to September, mining sector employers spent $896 per employee on structured training compared with the next highest industry, air transport, which spent $557. The all-industry average was just $185.

While mining industry training expenditure was the highest of all industries, only 26% of employers in mining were providing training, well above the all-industry average of 18%. Training hours per employee were also the highest at over 17 compared with the average of just under five hours. Significantly, mining had lifted its training effort since 1993, whereas the all-industry average expenditure per employee fell over that period.

Some training issues in mining

- Because of its geographical characteristics, mining should be one of the main target industries for development of new remote technologies for training delivery.
- The question of equitable access to government funding needs to be explored further for this industry. The current 'training areas' used in data collection do not allow easy identification of training effort allocated to mining. Mining is a small industry in employment terms but one which is fairly heavily reliant on VET-level skills. At present it is the highest spending sector on industry training.
- Recent redundancies in the industry, not an uncommon feature of the industry, raise the question of the level of retraining necessary to assist miners displaced from one sector of the industry seeking work in other sectors or regions.

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- The issue of improving the quality and relevance of information on careers and jobs in the industry also requires attention. The response of graduates in the GDS indicates that this is a particularly poorly addressed need.
- The downturn in Asian economies is likely to have a negative impact on demand for skills in mining in the short to medium term.
- Given the importance of coal mining to certain regional economies, especially in New South Wales and Queensland, the potential impact of greenhouse policies, which might reduce the demand for Australian coal exports, should be incorporated into planning for training and labour market program provision.

The national ITAB has raised the following as emerging VET issues:

- Projects of importance to the industry include:
  - research into delivery and assessment in geographically remote or isolated regions, particularly the investigation of the potential for using interactive multimedia
  - research into industry demographics, with emphasis on areas such as establishing a national database of skill shortages and mapping industry labour trends

Appendix

The following table is extracted from the ANTA resource allocations for 1997 document, available at their website. It shows the planned allocations of government-funded training between the ANTA-defined 'training areas' in terms of 'annual hours curriculum' (AHC).

Table A2.1: Key national shifts in activity between 1996 revised estimates and 1997 projected activity (AHC '000s)

Industry training area	1996 revised	1997 projected	Total increase	Total increase as % of 1996 revised	% of overall increase
Category A					
Arts, Entert, Sports and Rec	11 408	11 928	520	4.6	5.5
Automotive	8 221	8 576	355	4.3	3.7
Building and Construction	18 785	19 009	224	1.2	2.4
Comm Services, Health and Ed	20 910	22 382	1 471	7.0	15.5
Finance, Banking and Insurance	3 420	3 468	48	1.4	0.5
Food Processing	2 454	2 851	396	16.1	4.2
TCF and Furnishings	5 714	5 813	100	1.7	1.0
Communications	1 883	1 963	80	4.3	0.8
Engineering and Mining	15 654	16 607	952	6.1	10.0
Primary Industry	11 874	12 217	343	2.9	3.6
Process Manufacturing	397	479	82	20.6	0.9
Sales and Personal Service	6 527	6 752	225	3.4	2.4
Tourism and Hospitality	16 707	18 151	1 444	8.6	15.2
Transport and Storage	1 686	1 851	164	9.8	1.7
Utilities	11 898	12 145	247	2.1	2.6
Category B					
Business and Clerical	42 412	43 117	705	1.7	7.4
Computing	11 969	12 641	672	5.6	7.1
Science, Technical and Other	6 727	6 870	143	2.1	1.5
Category C					
Gen Education and Training	40 046	41 212	1 166	2.9	12.3
Unallocated	622	779	157	25.2	1.6
Total	**239 316**	**248 810**	**9 494**	**4.0**	**100.0**

Note: TCF – textiles, clothing and footwear

Source: Publications, *ANTA Resource Allocations 1997*, <www.anta.gov.au>

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Table A2.2: Employed persons by occupation in the mining industry, 1987 and 1996

ASCO code and occupation	1987 ('000s)	1996 ('000s)	Change 1987 to 1996 ('000s)	Change 1987 to 1996 Average annual %
3299 Other engineering and building assoc/technicians	4.1	2.3	–1.8	–6.4
4103 Metal fitters and machinists	9.3	7.4	–1.9	–2.6
4309 Electrical mechanics	3.3	4.7	1.4	4.1
7105 Truck drivers	4.9	5.4	0.5	1.1
7201 Excavating and earthmoving plant operators	10.8	12.2	1.4	1.4
7399 Other stationary plant operators	3.2	3.6	0.4	1.4
8415 Mining and mineral ore treating labourers	16.9	12.0	–4.9	–3.8
Other occupations	49.3	40.0	–9.3	–2.4
Total all occupations	**101.8**	**87.6**	**–14.2**	**–1.7**

Note: As estimates of less than 3500 are subject to high statistical error, they are listed against specific occupations only where there was a higher estimate in either 1987 or 1996. Where estimates of less than 3500 were recorded for both 1987 and 1996, they are included in the 'other occupations' category

Source: ABS, Labour force survey, unpublished data

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Table A2.3: Mining—major occupations by educational attainment at 1996 Census

Mining	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
ASCO code and occupation									
1 Managers and Administrators	2 531	280	334	909	233	4 287	358	1 768	6 413
2 Professionals	7 197	535	760	818	209	9 519	384	1 497	11 400
3 Associate Professionals	751	270	549	1 855	600	4 025	585	3 148	7 758
4 Tradespersons and Related Workers	253	112	449	12 770	245	13 829	854	4 419	19 102
5 Advanced Clerical and Service Workers	136	110	79	41	319	685	274	1 437	2 396
6 Intermediate Clerical, Sales and Service Workers	224	103	156	403	276	1 162	314	2 900	4 376
7 Intermediate Production and Transport Workers	214	184	224	5 688	656	6 966	1 822	19 620	28 408
8 Elementary Clerical, Sales and Service Workers	32	16	15	69	20	152	34	363	549
9 Labourers and Related Workers	77	43	55	798	105	1 078	312	3 056	4 446
0 Inadequately described	44	20	34	343	26	467	73	559	1 099
Not stated	15	6	5	45	6	77	66	170	313
Not applicable	–	–	–	–	–	–	–	–	–
Total	**11 474**	**1 679**	**2 660**	**23 739**	**2 695**	**42 247**	**5 076**	**38 937**	**86 260**

Source: ABS, 1996 Census of population and housing

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Table A2.4: Educational attainment of employed persons by industry, occupation (3-digit ASCO) and type of post-school qualification at 1996 Census

Mining	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
ASCO code and occupation									
100 Managers and Administrators nfd	150	25	14	56	18	263	37	195	495
110 Generalist Managers nfd	0	0	0	0	0	0	0	0	0
111 General Managers and Administrators	398	30	27	34	12	501	40	115	656
119 Miscellaneous Generalist Managers	8	5	7	28	4	52	9	34	95
120 Specialist Managers nfd	39	7	5	7	3	61	5	15	81
121 Resource Managers	438	44	49	31	19	581	39	140	760
122 Engineering, Distribution and Process Managers	1 090	135	199	701	153	2 278	201	1 110	3 589
123 Sales and Marketing Managers	120	13	12	16	6	167	9	48	224
129 Miscellaneous Specialist Managers	281	18	19	21	15	354	12	50	416
131 Farmers and Farm Managers	3	3	3	15	3	27	6	61	94
200 Professionals nfd	44	5	7	5	4	65	6	23	94
210 Science, Building and Engineering Professionals nfd	6	0	0	0	0	6	0	0	6
211 Natural and Physical Science Professionals	3 099	60	50	24	27	3 260	64	214	3 538
212 Building and Engineering Professionals	2 076	199	433	456	48	3 212	132	292	3 636
220 Business and Information Professionals nfd	12	0	0	0	0	12	0	0	12
221 Accountants, Auditors and Corporate Treasurers	827	46	90	3	11	977	35	161	1 173
222 Sales, Marketing and Advertising Professionals	75	9	11	17	5	117	8	63	188
223 Computing Professionals	335	34	35	35	22	461	19	185	665
229 Miscellaneous Business and Information Profs	382	56	60	180	59	737	68	389	1 194
230 Health Professionals nfd	0	0	0	0	0	0	0	0	0
231 Medical Practitioners	7	0	0	3	0	10	3	7	20
232 Nursing Professionals	32	36	0	0	3	71	4	3	78
238 Miscellaneous Health Professionals	7	0	0	0	0	7	0	0	7
240 Education Professionals nfd	0	0	0	0	0	0	0	0	0
241 School Teachers	3	3	3	3	0	12	3	4	19
242 University and Vocational Education Teachers	3	3	0	0	0	6	0	3	9

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Mining	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
249 Miscellaneous Education Professionals	4	3	0	3	3	13	0	5	18
250 Social, Arts and Miscellaneous Professionals nfd	0	0	0	0	0	0	0	0	0
251 Social Welfare Professionals	6	5	0	3	3	17	4	14	35
252 Miscellaneous Social Professionals	128	3	0	5	3	139	0	9	148
253 Artists and Related Professionals	9	6	4	14	3	36	3	21	60
254 Miscellaneous Professionals	140	67	68	64	21	360	33	102	495
300 Associate Professionals nfd	3	0	0	9	0	12	0	13	25
310 Science/Engineering and Related Assoc Profs nfd	13	3	11	32	7	66	4	57	127
311 Medical and Science Technical Officers	110	33	79	136	67	425	69	694	1 188
312 Building/Engineering Associate Professionals	212	122	301	1 239	383	2 257	332	1 423	4 012
320 Business and Administrative Assoc Profs nfd	0	0	0	0	0	0	0	0	0
321 Finance Associate Professionals	51	5	0	4	3	63	5	35	103
329 Miscellaneous Business/Admin Assoc Profs	271	73	108	181	70	703	90	563	1 356
330 Managing Supervisors (Sales and Service) nfd	0	0	0	0	0	0	0	0	0
331 Shop Managers	3	0	0	8	3	14	4	25	43
332 Hospitality and Accommodation Managers	0	4	0	51	3	58	9	21	88
339 Miscellaneous Mngr. Supervisors (Sales and Service)	30	6	3	45	3	87	8	78	173
340 Health and Welfare Assoc Professionals nfd	0	0	0	0	0	0	0	0	0
341 Enrolled Nurses	0	0	0	0	0	0	0	0	0
342 Welfare Associate Professionals	0	0	0	0	0	0	0	3	3
349 Miscellaneous Health and Welfare Associate Profs	3	0	3	9	0	15	3	9	27
390 Other Associate Professionals nfd	0	0	0	0	0	0	0	0	0
391 Police Officers	0	0	0	0	0	0	0	0	0
399 Miscellaneous Associate Professionals	54	21	41	140	64	320	60	224	604
400 Tradespersons and Related Workers nfd	12	8	19	558	10	607	41	116	764
410 Mechanical/Fabrication Engineering Trades nfd	0	0	0	48	0	48	3	9	60
411 Mechanical Engineering Tradespersons	130	35	169	6 127	61	6 522	304	980	7 806
412 Fabrication Engineering Tradespersons	6	4	11	1 303	10	1 334	68	217	1 619

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Mining	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
421 Automotive Tradespersons	7	6	11	629	9	662	32	136	830
431 Electrical and Electronics Trades	23	14	188	2 880	37	3 142	110	435	3 687
440 Construction Tradespersons nfd	0	0	0	0	0	0	0	0	0
441 Structural Construction Trades	0	3	3	128	0	134	13	73	220
442 Final Finishes Construction Trades	0	0	0	27	0	27	3	13	43
443 Plumbers	0	0	3	93	0	96	7	53	156
451 Food Tradespersons	0	4	4	41	3	52	8	58	118
460 Skilled Agricultural/Horticultural Workers nfd	0	0	0	0	0	0	0	0	0
461 Skilled Agricultural Workers	0	0	0	3	0	3	0	0	3
462 Horticultural Tradespersons	3	3	3	16	3	28	7	61	96
490 Other Tradespersons and Related Workers nfd	0	0	0	5	0	5	0	18	23
491 Printing Tradespersons	0	0	0	5	0	5	0	5	10
492 Wood Tradespersons	0	0	0	0	0	0	0	5	5
493 Hairdressers	0	0	0	3	0	3	0	0	3
494 Textile, Clothing and Related Trades	0	0	0	0	0	0	0	3	3
498 Miscellaneous Tradespersons and Related Wkrs	69	38	39	904	112	1 162	258	2 237	3 657
500 Advanced Clerical and Service Workers nfd	0	0	0	0	0	0	0	0	0
511 Secretaries and Personal Assistants	102	91	59	25	300	577	244	1 213	2 034
590 Other Advanced Clerical and Service Wkrs nfd	0	0	0	0	0	0	0	0	0
591 Advanced Numerical Clerks	30	17	20	10	16	93	25	202	320
599 Miscellaneous Advanced Clerical and Service Wkrs	9	3	0	5	3	20	5	22	47
600 Intermediate Clerical, Sales and Service Wkrs nfd	0	0	0	3	0	3	0	6	9
610 Intermediate Clerical Workers nfd	0	0	0	0	0	0	0	0	0
611 General Clerks	44	38	37	50	74	243	86	795	1 124
612 Keyboard Operators	28	10	12	17	35	102	34	251	387
613 Receptionists	14	4	13	3	31	65	27	246	338
614 Intermediate Numerical Clerks	37	16	37	29	57	176	50	564	790
615 Material Record and Despatch Clerks	63	28	39	222	63	415	88	836	1 339

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Mining	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
619 Miscellaneous Intermediate Clerical Workers	18	4	7	18	8	55	7	74	136
621 Intermediate Sales and Related Workers	24	0	10	43	0	77	11	70	158
630 Intermediate Service Workers nfd	0	0	0	3	0	3	0	3	6
631 Carers and Aides	3	0	0	12	3	18	4	15	37
632 Hospitality Workers	0	0	0	3	0	3	3	17	23
639 Miscellaneous Intermediate Service Workers	0	0	0	3	5	8	5	23	36
700 Intermediate Production and Transport Wkrs nfd	3	6	7	138	23	177	36	495	708
710 Intermediate Plant Operators nfd	4	3	3	164	13	187	85	934	1 206
711 Mobile Plant Operators	5	16	16	419	49	505	162	2 225	2 892
712 Intermediate Stationary Plant Operators	19	21	22	522	79	663	171	1 842	2 676
720 Intermediate Machine Operators nfd	15	14	20	650	74	773	228	2 493	3 494
721 Intermediate Textile/Clothing/Related Mach Ops	0	0	0	0	0	0	0	3	3
729 Miscellaneous Intermediate Machine Operators	3	3	0	37	3	46	5	118	169
731 Road and Rail Transport Drivers	10	23	13	507	74	627	231	2 427	3 285
790 Other Intermediate Prod'n and T'port Wkrs nfd	0	0	0	0	0	0	0	3	3
791 Intermediate Mining and Construction Workers	141	90	129	3 102	302	3 764	840	8 533	13 137
799 Misc Intermediate Prod'n and Transport Wkrs	9	10	14	147	38	218	63	549	830
800 Elementary Clerical, Sales and Service Wkrs nfd	0	0	0	0	0	0	0	0	0
811 Elementary Clerks	9	3	0	6	3	21	5	71	97
820 Elementary Sales Workers nfd	3	0	0	3	0	6	0	3	9
821 Sales Assistants	3	3	3	6	3	18	4	46	68
829 Miscellaneous Elementary Sales Workers	0	0	3	5	3	11	0	57	68
831 Elementary Service Workers	17	12	9	51	12	101	24	186	311
900 Labourers and Related Workers nfd	3	0	3	46	0	52	25	209	286
911 Cleaners	6	4	3	40	4	57	35	299	391
920 Factory Labourers nfd	0	0	0	0	0	0	0	0	0
921 Process Workers	8	5	3	83	12	111	32	317	460
922 Product Packagers	0	0	0	0	3	3	3	24	30

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Mining	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
990 Other Labourers and Related Workers nfd	0	0	0	3	0	3	0	3	6
991 Mining, Construction and Related Labourers	58	28	42	498	71	697	178	1 820	2 695
992 Agricultural and Horticultural Labourers	0	0	0	8	3	11	0	50	61
993 Elementary Food Preparation and Related Wkrs	0	0	0	8	3	11	0	34	45
999 Miscellaneous Labourers and Related Workers	4	6	5	112	11	138	35	300	473
099 Inadequately described	44	20	34	343	26	467	73	559	1 099
Not stated	15	6	5	45	6	77	66	170	313
Not applicable	–	–	–	–	–	–	–	–	–
Total	**11 473**	**1 681**	**2 660**	**23 737**	**2 703**	**42 254**	**5 068**	**38 934**	**86 256**

Note: nfd – not further defined

Source: ABS, 1996 Census of population and housing

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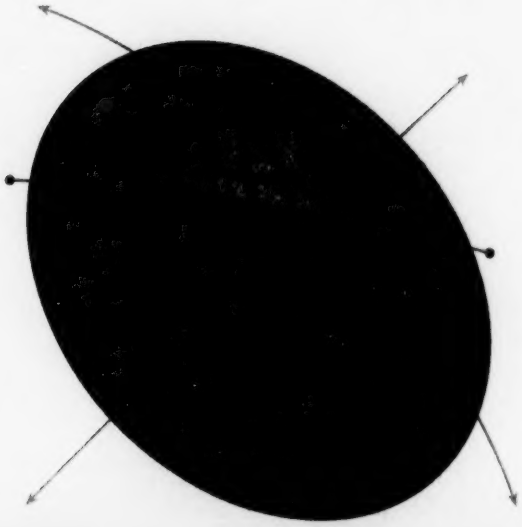

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